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Report to the Chairman, Subcommittee  
on Legislation and National Security,  
Committee on Government Operations,  
House of Representatives

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# NAVY STRATEGIC FORCES

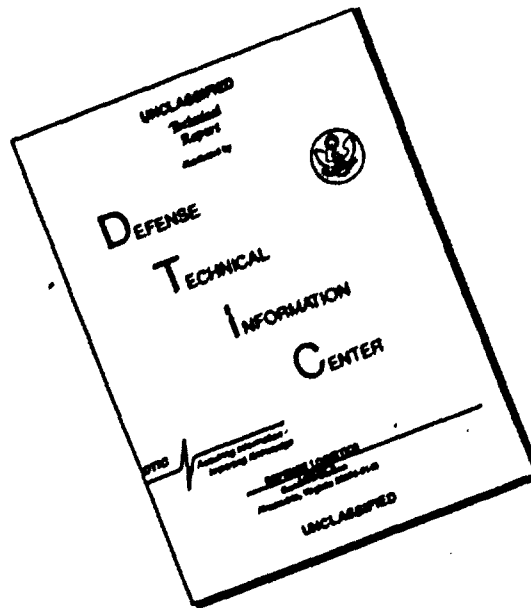
## Trident II (D-5) Missile Contract Incentives



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United States  
General Accounting Office  
Washington, D.C. 20548

National Security and  
International Affairs Division

B-241399

November 14, 1990

The Honorable John Conyers, Jr.  
Chairman, Subcommittee on  
Legislation and National Security  
Committee on Government Operations  
House of Representatives

Dear Mr. Chairman:

This report responds to your request that we provide information on the Navy's Trident II (D-5) missile contract's reliability incentives and contractor/government cost-sharing arrangements. You expressed interest after the Navy experienced two D-5 missile failures in the first three sea-launched missile flight tests.



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## Results in Brief

The D-5 missile full-scale development and initial production contract is a cost-plus-incentive-fee contract that includes reliability and other performance and program incentives. The reliability incentive was not affected by the two failed sea-launched development missile flight tests because the tests were not made during the period designated as the basis for calculating incentive fees. The contractor has received a \$112-million interim payment out of a possible \$138.5-million total reliability incentive target.

The D-5 missile system development effort is almost complete, and the contractor estimates the contract will exceed the \$3,839-million development target cost by about \$100 million. These overruns were caused largely by the need to design and incorporate changes to the missile because of the failed sea-launched tests. The government's obligation is \$90 million of this overrun, and the contractor's obligation is \$10 million.

## Background

The Navy's Office of Strategic Systems Programs (SSP) is responsible for the development, acquisition, and maintenance of the Trident II system and the Navy's predecessor submarine-launched ballistic missile systems. Compared to the Trident I system, the Trident II system is designed to reach a target with improved accuracy and greater explosive power.

## D-5 Contract

The D-5 missile program entered full-scale development in October 1983. Lockheed Missiles & Space Company, Inc., is the prime contractor. Lockheed also was the prime contractor for the Navy's previous submarine-launched ballistic missiles, beginning with the Polaris A-1 missile.

The D-5 missile contract with Lockheed covers full-scale development and initial production, development flight test analyses, and other tasks, as shown in table 1.

**Table 1: D-5 Missile Operational Systems Development and Production Contract Components**

Dollars in millions			
	Target cost	Target fee	Target price
Missile system development	\$3,838.6	\$331.6	\$4,170.2
Production hardware	929.9	82.3	1,012.2
Other hardware	49.5	4.3	53.8
Strategic Weapons Facility, Atlantic activation	385.3	33.3	418.6
Engineering support services	48.7	4.2	52.9
Submarine outfit and shipyard support	71.3	4.9	76.2
Special program tasks	18.1	1.6	19.7
Special orders	20.5	1.5	22.0
Re-entry body processing	6.1	.5	6.6
System requirements evaluation	5.6	.5	6.1
<b>Total</b>	<b>\$5,373.6</b>	<b>\$464.7</b>	<b>\$5,838.3</b>

## D-5 Development Flight Tests

From January 1987 through January 1989, 19 D-5 land-launched development missile flight tests were conducted. One was considered a "no test," 2 were failures, 1 was rated as a partial success, and the remaining 15 tests were considered successes by the Navy.

The 20th through 28th tests were sea-launched development missile flight tests from Trident II submarines. This series of nine tests began on March 21, 1989, with a failure. After analysis of the failure and corrective action, missile testing resumed on August 2, 1989, with the 21st development flight test, which the Navy considered a success. On August 15, 1989, the 22nd development flight test occurred, which was a failure. After further analysis, design, and corrective action, missile testing again resumed on December 4, 1989, with the successful launch of the 23rd development missile flight test. Subsequently, by February 12, 1990, the missile test program recorded successes in all five of the remaining sea-launched development missile flight tests. Also, the U.S.S.

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Tennessee and the U.S.S. Pennsylvania each successfully fired a Demonstration and Shakedown Operation<sup>1</sup> missile. These tests were conducted before the Trident II system reached its initial operational capability at the end of March 1990.

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## D-5 Contract Modifications

During 1987, the Congress reduced the Navy's fiscal year 1988 Research, Development, Test and Evaluation appropriation request for the Trident II system by \$50 million. In March 1988, SSP notified Lockheed that to accommodate this reduction SSP intended to decrease the number of development missile flight tests from 30 to 28, deleting 1 missile each from the land-launched and the sea-launched missile flight test series. SSP planned to modify the contract during the first quarter of 1989. Subsequently, the 2 missiles were transferred from the development portion of the contract to the initial production portion, increasing the initial production missile quantity from 52 to 54. Concurrently, the fiscal year 1989 follow-on production contract's planned missile quantity was reduced from 66 to 64.

Lockheed submitted its initial proposal for the contract modification to SSP on August 22, 1988. SSP and Lockheed reached final agreement on the modification of the incentive fee provisions on April 26, 1989. The modification was executed on August 9, 1989.

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## Reliability Incentives

In its August 22, 1988, proposal, Lockheed requested a change to the contract reliability provisions because of the loss of development data from the two flight tests deleted by the modification. Specifically, Lockheed proposed to reduce the final missile reliability target by 2 percentage points. SSP found a decrease in the missile reliability target unacceptable and countered with a proposal to delay the start of the reliability measurement period from the 21st to the 23rd development flight test. SSP's proposal was incorporated in the contract modification.

The 20th development missile flight test, which failed, was never planned to be considered in calculating the contract reliability incentive. As a result of the contract modification, the successful 21st missile flight test, which occurred prior to the modification being executed, and the failed 22nd missile flight test, made shortly after the modification

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<sup>1</sup>A Demonstration and Shakedown Operation is a test conducted before submarine deployment to verify the proper functioning and readiness of the strategic weapon system and the submarine by the crew. Missiles used in these tests are production missiles with test instrumentation replacing the missiles' warheads.

was executed, were not included in the reliability incentive measurement period. If these two tests had been included in the measurement period, the Navy would have withheld about \$23 million from Lockheed's first interim incentive fee payment.

The contract initially required Lockheed to deliver 30 development missiles and 52 production missiles to the Navy. It included performance incentives for reliability, accuracy, and range and incentives for quality and other program parameters. Depending on the contractor's performance, the incentive fees are either positive (raising the target fee for performance exceeding expectations) or negative (lowering the target fee for failing to meet expectations). SSP structured the contract to place the greatest emphasis on the reliability incentive, which comprises 75 percent of the performance and program incentive fee pool. The reliability fee ranges from a positive \$138.5 million to a negative \$138.5 million.

The contract's missile reliability incentive is based on 50 missile flight tests to be made over a measurement period that begins during sea-launched development missile flight tests and continues with Demonstration and Shakedown Operation tests and evaluation tests.<sup>2</sup> These tests are expected to be conducted during the first 3 years of the D-5's deployment. The contractor may be paid the maximum reliability fee even if two or three failures occur during the measurement period. Therefore, an early missile failure may not ultimately result in any reduction in the total reliability fee paid.

The contract provides for an interim incentive payment to Lockheed after the completion of the measurement period's first six missile flights and other interim payments as the testing progresses. Rather than being evenly distributed, the interim payments are structured to ensure that the Navy receives a highly reliable product early. Thus, if missile reliability is determined to be sufficiently above contract expectations, Lockheed could earn the maximum reliability fee in the second or third interim payment payable after 12 or 18 missile flight tests. If reliability declines later, however, Lockheed is liable to repay a portion of or all the reliability fees already received, or in the worst case, lose additional fees. According to the contract's provisions, Lockheed requested an interim incentive payment of about \$112 million, which SSP approved in June 1990.

<sup>2</sup>Evaluation tests are performed to ensure reliability confidence levels.

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## Cost Incentives

Cost-sharing of variances over or under the contract's target cost add to or take away from the contract's negotiated target fee. Under the development portion of the D-5 contract, the government's obligation is 90 percent of cost overruns above the target cost. Lockheed's obligation is the remaining 10 percent, which reduces its target fee. In case of cost underruns, Lockheed earns 10 percent, increasing its total contract fee above the negotiated target fee. For the contract's initial production portion, Lockheed's obligation is 30 percent of costs over the target cost, and the government's obligation is 70 percent. Lockheed can also earn 30 percent of underruns.

According to Lockheed's cost performance report for October 1983 through June 1990, the missile development is essentially complete, and Lockheed estimates that the contract will be about \$100 million over the \$3,839-million development target cost at completion. Lockheed's share of the overrun is about \$10 million, which would reduce its development target fee from \$332 million to \$322 million. For initial production, Lockheed estimates it will earn at completion an additional \$3 million from an estimated \$10-million underrun of the \$930-million target cost. That would raise Lockheed's production target fee to \$85 million.

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## Scope and Methodology

We obtained and analyzed information from (1) SSP, Arlington, Virginia, and (2) Lockheed. We reviewed documents relative to the D-5 missile contract terms, conditions, and modifications. These documents included a chronology of events leading to the contract modification of the evaluation period for reliability incentives. We also reviewed Lockheed's cost performance reports on the D-5 contract and SSP's comments on the cost reports. We interviewed SSP's technical director; deputy technical director; the heads of the Missile Branch, the Missile Engineering Section, and the Contracts Office; the cognizant contracting officer; and officials in the Program Evaluation and Resources Branches to obtain information on the contractor's performance relative to the contract's incentives and cost-sharing arrangements.

We conducted our review from January to October 1990 in accordance with generally accepted government auditing standards. As requested, we did not obtain official agency comments.

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As requested, we plan no further distribution of this report until 30 days after its issue date, unless you publicly announce its contents earlier. At that time, we will send copies to the Secretaries of Defense and

the Navy; appropriate congressional committees; and other interested parties. We will make copies available to others upon request.

Brad Hathaway, Associate Director; Bernard Easton, Assistant Director; and Fred Fenstermaker, Evaluator-in-Charge, were major contributors to this report. If you or your staff have questions on this report, please call me on (202) 275-6504.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Martin M. Ferber", with a long horizontal flourish extending to the right.

Martin M Ferber  
Director, Navy Issues